PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 10-16

March 25, 2010

Agenda Item No.: 10-3-1

WHEREAS, Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, research proposal number 2694-267, entitled "Identifying Determinants of Very Low Energy Consumption Rates Observed in Some California Households," has been submitted by the University of California, Davis (UCD);

WHEREAS, Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee (RSC) has reviewed and recommends for funding:

> Proposal number 2694-267, entitled "Identifying Determinants of Very Low Energy Consumption Rates Observed in Some California Households," submitted by UC Davis, for a total amount not to exceed $104,911.

NOW, THEREFORE, BE IT RESOLVED that ARB, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of RSC and approves the following:

> Proposal number 2694-267, entitled "Identifying Determinants of Very Low Energy Consumption Rates Observed in Some California Households," submitted by UCD, for a total amount not to exceed $104,911.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $104,911.

ATTACHMENT A

Identifying Determinants of Very Low Energy Consumption Rates Observed in Some California Households

Background

Household energy consumption makes up a substantial portion of California's greenhouse gas (GHG) emissions, 14 percent in 2002-2004. Voluntary actions as well as residential energy efficiency have been identified by the Scoping Plan as key components of the State's strategy to meet a 2020 GHG emissions goal equal to the 1990 baseline. To meet the 2050 goal of 80 percent reductions in GHG emissions, dramatic shifts in the ways residential consumers of goods, energy, and services choose and use technologies will be necessary. Thus, both near-term and longer-term GHG emissions targets require substantial behavioral changes. Historically, behavioral change measures have received relatively little support as an energy management strategy, and uncertainty regarding viable scenarios for very low energy consumption in 2050 prevails. The proposed research addresses both of these critical gaps by offering concrete examples of how Californian households live with relatively little energy, what motivates households to consume less than the norm, and what factors can be leveraged to induce other households to consume less energy. Of particular importance is that the strategies unveiled by this research are practicable within the current constellation of social, technological, and institutional constraints.

Objective

This research will forge a detailed understanding of characteristics and behaviors that coincide with and contribute to the very low electricity usage found in a subset of California households. This research will identify factors in addition to hardware and occupant levels that coincide with very low energy use. Such factors may include demographics, end use technologies, and house size; as well as domestic habits, patterns of use, and attitudes about convenience, comfort, or energy itself. Hypothesis testing will be employed to rigorously analyze the association of the several factors to low energy consumption, including: physical and demographic characteristics, income, consumer awareness, and expert advice regarding low energy consumption.

Methods

Through in-home interviews and a detailed survey, this research will explore both the physical, social, and behavioral factors contributing to low energy use as well as attitudes among low use customers about their uses of energy. Primary tasks include:

1) In partnership with a utility, acquire a consumer database comprising residential accounts at the lower quantiles of the usage spectrum for both gas and electricity;

2) Draft and pretest a detailed survey with input from project advisory committee to ensure a powerful survey instrument whose results will support the needs of the State;

3) Administer the survey, with measures (including coded identification numbers) taken to protect customer privacy while encouraging participation;

4) Analyze findings from interviews and household surveys. Identify household profiles based on physical, social-demographic, and attitudinal categories developed through systematic coding of survey responses. Test hypotheses to clarify the relationships of income, physical and demographic characteristics, expert advice, and consumer awareness to low energy consumption; and

5) Consult with project advisors, including representatives from the State, to synthesize low-consumption household profiles and policy recommendations; draft and prepare final report.

Expected Results
To date, efforts to reduce residential energy consumption have focused on technological interventions or marginal changes in behavior, but have been bereft of positive examples from households that consume very little energy while maintaining a high standard of living. This research addresses that critical gap. The proposed research will investigate the circumstances and behaviors that correspond to very low energy consumption levels in a subset of California households. Research results will help inform voluntary and behavioral change strategies, as well as efforts to promote technological energy-saving strategies, whose success also depends on human behaviors, e.g., purchase, installation, operation. The timeliness of such research is underlined by the increasing urgency of making significant reductions of greenhouse gas emissions in the near-term coupled with recent works (e.g., Dietz et al, PNAS 2009) demonstrating that plausible behavioral interventions can yield substantial residential energy savings in the very near term.

Significance to the Board
Study results will help Air Resources Board, utilities, and other stakeholders, design programs to reduce residential electricity consumption. It is imperative that State agencies resolve the range of options available to and practiced by California households if they are to effectively engage the public to make voluntary behavioral changes. The direct results of the proposed work, as well as the dataset, methodological findings, and establishment of working relationships between agencies and utilities involved with residential behavioral change efforts, will be extremely valuable to the State.

Contractor:
University of California, Davis

Contract Period:
36 months

Principal Investigator (PI):
Alan Meier

Contract Amount:
$104,911

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
The project principal investigator, Dr. Alan Meier, is Associate Director and a Faculty Researcher with the Energy Efficiency Center at UCD; as well as a senior scientist at Lawrence Berkeley National Laboratory. His research has had direct and significant impact on energy policy. For example, his international plan to reduce standby in all devices to less than 1 watt has been endorsed by the G8 countries.

The highly interdisciplinary research team brought together for this research has recently conducted highly successful energy analyses at the intersection of technological, social, and behavioral factors. Proposal reviewers from multiple agencies concur that the researchers' previous reports offer new and useful information that supports demand-side energy management, policy, and planning.

Prior Research Division Funding to UCD:

Year	2008	2007	2006
Funding	$1,209,135	$935,020	$1,684,890

B U D G E T S U M M A R Y

Contractor: University of California, Davis

Identifying Determinants of Very Low Energy Consumption Rates Observed in Some California Households

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	34,124	
2.	Subcontractors	$	39,502[1]	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	1051	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	8,700	
7.	Mail and Phone	$	6,426	
8.	Supplies	$	1,099	
9.	Analyses	$	0	
10.	Miscellaneous	$	5,771	
	Total Direct Costs			$96,673
INDIRECT COSTS				
1.	Overhead	$	8,238	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$8,238
TOTAL PROJECT COSTS				**$104,911**

[1] The team for the proposed research has been selected to leverage the unique expertise of a highly credentialed consultant who has obtained and analyzed residential utility data sets in both California and Oregon; and has extensive experience providing economic, regulatory, and policy analyses to state consumer advocate offices and state public utility commissions on all aspects of energy efficiency through his work for the California Public Utilities Commission, The Utility Reform Network (TURN), and Energy Economics, Inc.

S U B C O N T R A C T O R S' B U D G E T S U M M A R Y

Subcontractor: Reuben Deumling

Description of subcontractor's responsibility: Dr. Deumling, a private consultant with extensive experience providing economic, regulatory, and policy analyses to state consumer advocate offices and state public utility commissions on all aspects of energy efficiency, will negotiate a nondisclosure agreement with the appropriate electrical service provider[s], coordinate survey logistics with UCD researchers, perform analysis, and coordinate interpretation as well as technical writing.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	38,852	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	0	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	650	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$39,502
INDIRECT COSTS				
1.	Overhead	$	0	
2.	General and Administrative Expenses	$		
3.	Other Indirect Costs	$		
4.	Fee or Profit	$	0	
	Total Indirect Costs			$0
TOTAL PROJECT COSTS				**$39,502**